Long-Term Effectiveness of "Zero-Lift" Program for Preventing Injuries to Nursing Personnel

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Industries with High Incident Rates
(Bureau of Labor Statistics)

Industry	Incident Rate
Meat-product processing	27.6
Motor-vehicles manufacturing	24.0
Nursing-care facilities	17.3
Office-furniture manufacturing	15.5
Trucking Services	14.0
Logging	13.8
Construction	12.2

Occupations with Greatest Claims for Back Strains/Sprains

Occupation	Claims/100 workers
1. Miscellaneous Laborers	12.3
2. Garbage Collectors	11.1
3. Warehousemen	9.3
4. Miscellaneous Mechanics	5.6
5. *Nursing Aides*	3.6
6. Non-specific Laborers	3.4
7. Material Handlers	3.4
8. Lumbermen	3.3
9. *Practical Nurses*	3.3
10. Construction Laborers	2.8

Nursing Aides Suffer Majority of Back Injuries

Body Part	% of Injuries
1. Trunk* (Back, Abdomen, Shoulders)	61%
2. Legs & Lower Extremities	11%
3. Arms & Upper Extremities	12%
4. All Other Parts	16%
*Back Only	46%

Nursing Home Employees

Nursing
House Keeping
Dietary
Maintenance

Primary Causes of Injury to Nursing Personnel

- Manual lifting and transferring of residents
- Preventing resident from falling
- Slip and Fall
  (Urine by bed side, wet floor, bathroom, kitchen, parking lot, etc.)
- Resident assault

Borg RPE Scale

- 6
- 7 Very, very light
- 8
- 9 Very light
- 10
- 11 Light
- 12
- 13 Somewhat hard
- 14
- 15 Hard
- 16
- 17 Very hard
- 18
- 19 Extremely hard
- 20 Maximal exertion

how stressful job is?

Most Stressful Tasks

1. Toilet to WC (14.3)
2. WC to Toilet (14.1)
3. WC to Bed (14.2)
4. Bed to WC (14.2)
5. Bathtub to WC (13.3)
6. Chairlift to WC (13.8)
7. Weighting residents (13.8)
8. Lifting residents in bed (13.8)
9. Repositioning residents in bed (12.9)
10. Repositioning residents in WC (12.0)
11. Changing "attends" (11.3)
12. Making bed with resident (10.9)
13. Undressing residents (10.1)
14. Tying "supports" (9.7)
15. Feeding residents (9.7)
16. Making beds without residents (9.6)

Borg RPE Scale

Manual Lifting of Patients

- Several different techniques
- None has proven to be effective
- Acceptable in one health care facility, unacceptable in another
- All techniques exceed workers' strengths
- All techniques produce large forces on the spine

1 Person- Bear Hug & gait Belt

Bear Hug Transfer In Bathroom

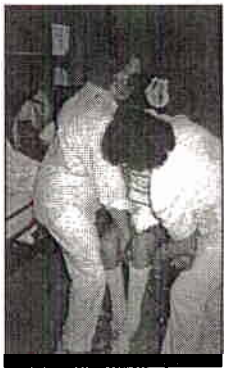
2 Person Gait Belt- WC to Bed

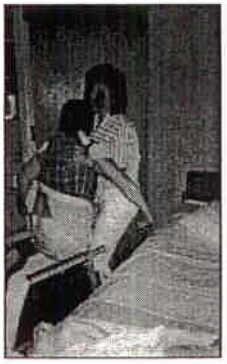
Pulling Legs & Bear Hug- Bed to WC

Hoyer transfer- Most Common Method

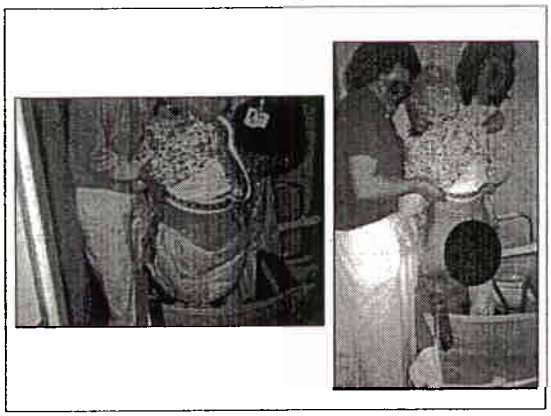
Most used

2 person under arm

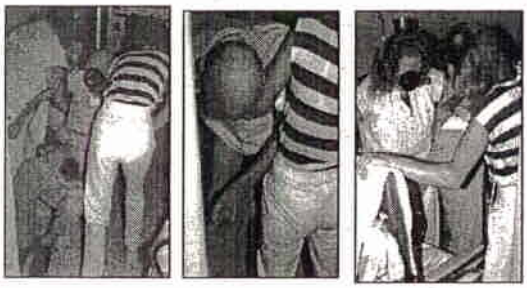




Bear hug

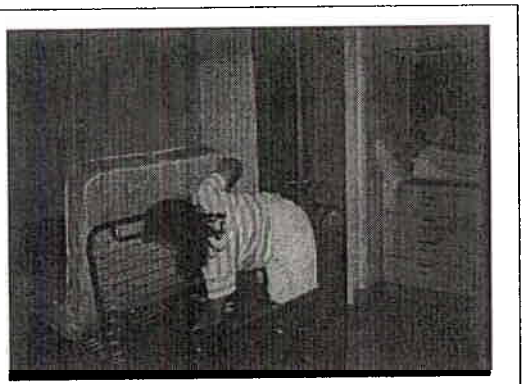


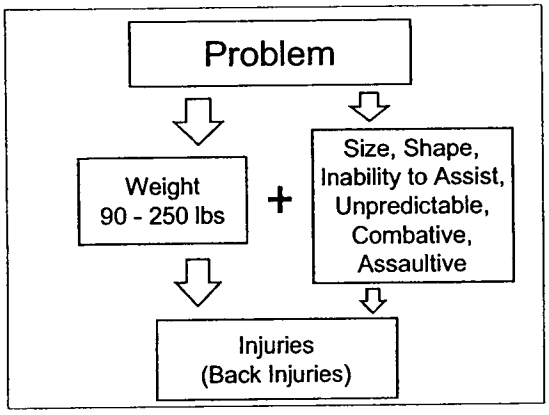
Confined Workspace



Much More Than A Lift

Postural Stresses

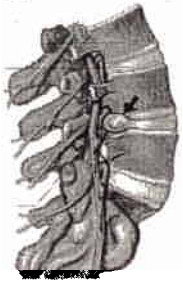



Problem
Weight
90 - 250 lbs
+
Size, Shape,
Inability to Assist,
Unpredictable,
Combative,
Assaultive
Injuries
(Back Injuries)

Maximum Acceptable Weights for Female and Male Workers

Percent Capable Population	Maximum Acceptable Weights (lbs)	
	Females	Males
90%	31	51
75%	35	68
50%	39	86
25%	46	103
10%	51	121

Compressive Force, Shear Force and Disc Herniation



Estimated Compressive Force on Low Back for Transferring residents from Wheelchair to Bed

Patient Weight (Percentile)	Estimated Compressive Force (lbs)
25th	993
50th	1084
75th	1143
90th	1252

*NIOSH recommends a safe limit of 770 lbs.

Why Body Mechanics is Not Enough

- Good body mechanics reduces stresses on the back.
- However, if the job is intrinsically unsafe, no amount of training on "safe lifting techniques" will make the job safe.

Why Ergonomics

$$\text{Strain} = \frac{\text{Job Physical Demands}}{\text{Worker's Physical Capabilities}}$$

Ergonomics Solution

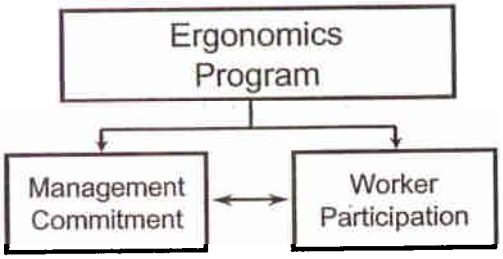
⇩

Provide a nearly lift free environment

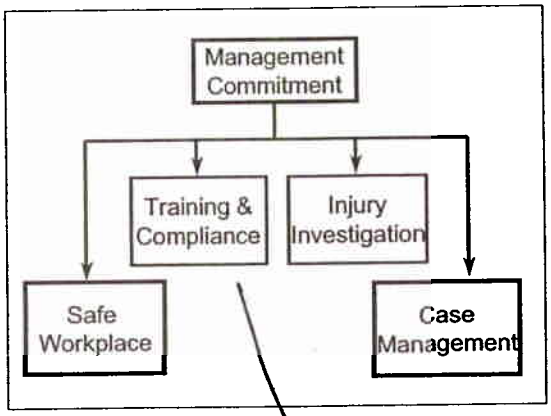
What to Expect

- Some reduction in injuries
- Substantial reduction in disability
  - Lost workdays
  - Restricted workdays
  - Workers' compensation cost
- Improved employee morale
- Improved patient care

Key Elements of an Ergonomics Program



Successful programs must have both management commitment + employee acceptance



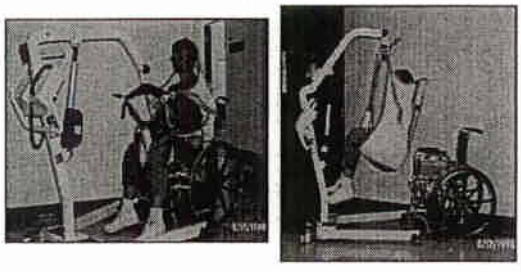
high turnover rate

Safe Workplace

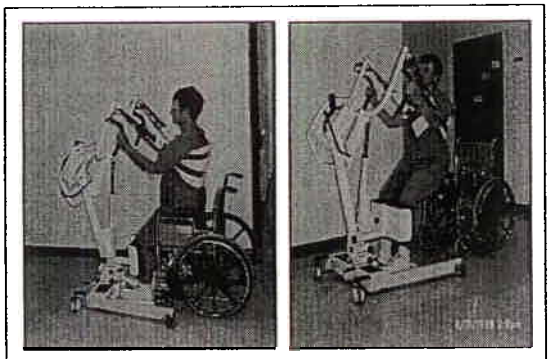
- Create a "we care" environment.
- Provide appropriate patient transferring devices.
- Provide an ergonomics coordinator.
- Address employees' problems and concerns in a timely fashion.
- Be flexible.

Equipment

- Total hoist with/without scale
- Sit/stand hoist
- Walking belt
- Repositioning device
- Shower chair
- Ramp type weighing scale
- Shower gurney



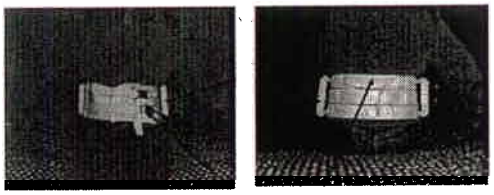
Total lift Hoist



Sit/Stand Hoist

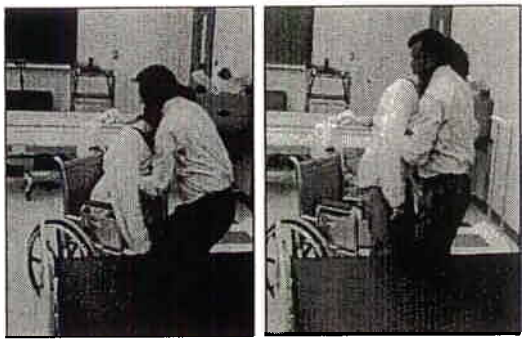
Patient can place one foot flat

Walking Belt



no lifting
-used pulling

Pull, Don't Lift.

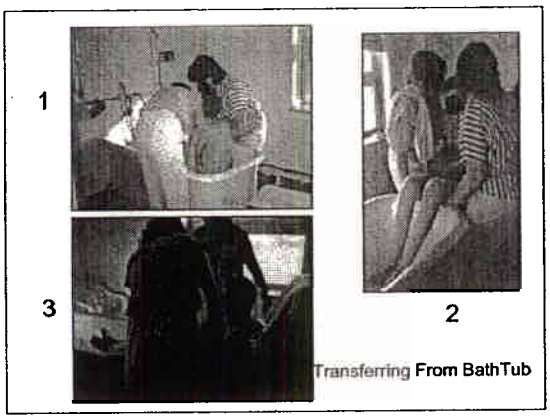


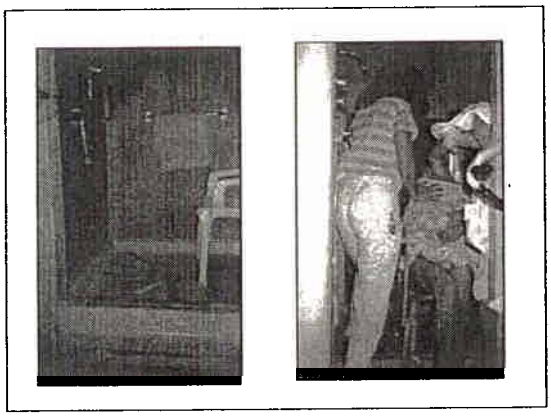
Walking Belt, 1 Person

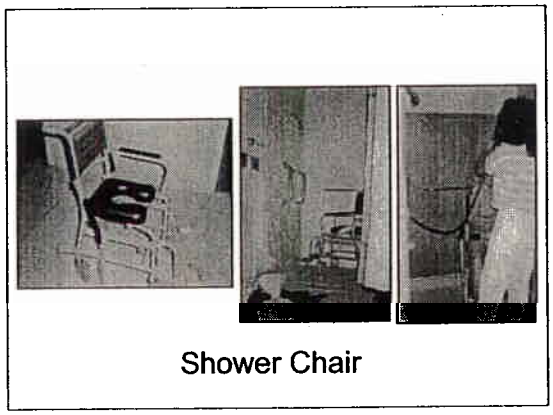
Walking Belt, 2 Persons

Patient can bear weight for 5 seconds

Bathing (Postural Stress)

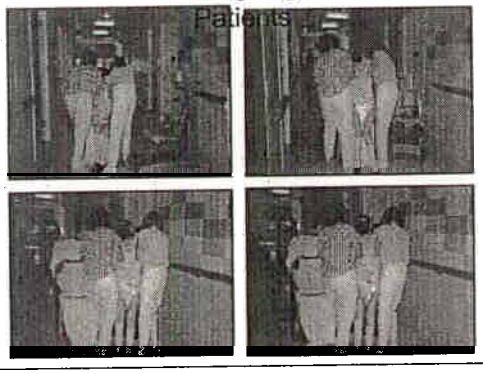

1
2
3
Transferring From BathTub



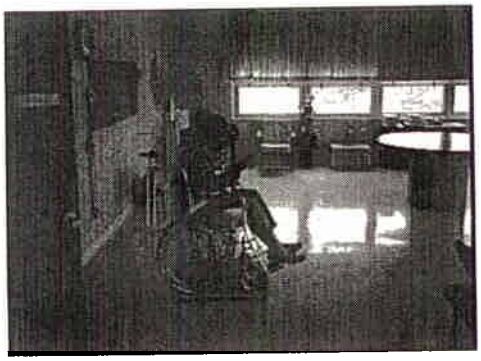

Shower Chair

Shower Chair for Toileting

Weighing Patients



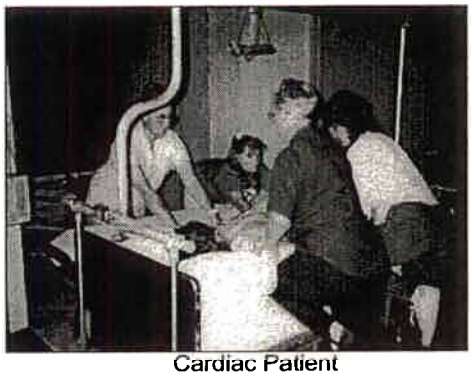
Ramp Type Weighing Scale



Repositioning in Bed

Repositioning in Bed

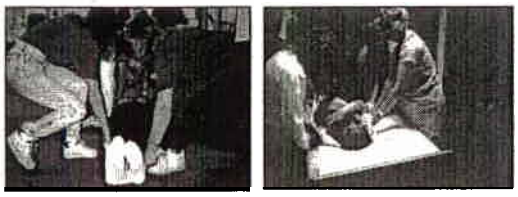

Centering Patient in Bed

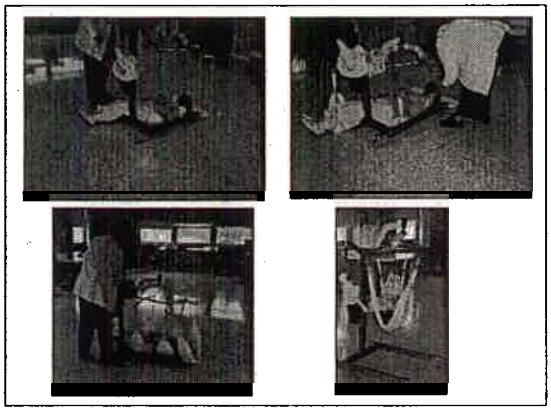


Cardiac Patient


Bed to Stretcher Transfer (NO Lifting)

Lifting off the Floor





Equipment Justification

- Equipment cost = $60,000
- Workers' compensation cost = $102,000 / year
  - After Intervention = 2,000 / year
- Payback period = less than 1 year
- Indirect cost = 4 times direct cost
- Lost and Restricted Workdays (86% ↓)
- Resident care ↑
- Injuries to residents ↓
- Overtime work ↓
- OSHA citation ↓
- Health department survey ↓

Avg over 3 yrs (direct costs)

this cost is not included in direct costs

Be Flexible and Accommodating

- Janitor was supposed to move heavy tables and chairs
- Told supervisor his back was hurting
- Supervisor told him not to worry. She got someone else to move tables and chairs, provided him with lighter work (Cleaning handrails, cleaning equipment, folding laundry, etc.)
- Next day, the janitor said his back was fine. He applied heat to it. He thanked the supervisor.

Supervisor comments:

"If I did not accommodate the employee, he would have probably gone to see a physician, claiming he hurt his back on the job. The doctor would have given him at least 10 days off on transitional duty, regardless of what it was."

Address Problems Before Serious Injuries Occur

Slip and Fall Injuries

Year	# of Injuries	Lost or Restricted Workdays	Incurred Cost	% of Total Cost
1993	2	62	$17,487	21%
1994	7	16	$2,104	5%
1995	8	153	$75,257	92%
1996	2	3	$359	1%

- implemented awareness program
Marked patient rooms who had bladder control issues
- issued flashlights

Laundry Departments

Several complaints of hand/wrist forearm pain:

- Pushing clothes in a overloaded rack
- Lifting bags full of wet laundry
- Loading dryers
  (Clothes get tangled up during spin cycle in washing machine)
- Emptying baskets/bins with low bottom

- Recommendations
  - Place fewer clothes on the racks
  - Reduce rack height by 6"
  - Provide sturdy platform
  - Good locks on wheels

Spring Loaded Bottom to Avoid Bending

Training

Training

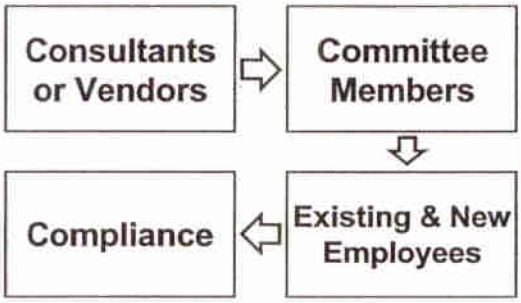
- All workers
  Nurses
  Nursing Aides
- All Management Staff
  DON
  Staff Development Coordinator
  Charge Nurses, etc.

Director of Nursing

Key Elements of Training

- Ongoing (Turnover rate = 80%)
- Hands-on practice
- Random monitoring
  - Reluctance to change
  - Patient transferring devices take more time
  - Enforcement of rules
  - Feedback
- Ergonomics program will not be effective if the equipment is not used.

Training



Injury Investigation

Injury Investigation

- Prevent future occurrence of similar injuries
- Did the job cause the injury?
  - Was proper patient transferring equipment used?
  - Lack of training?
  - Unsafe behavior?
- What corrective action should be taken to prevent future injuries?
- Common practice
  "Employee Incident Report Form"
  "Be more careful in the future."

Some Questionable Injuries

- Walking in the hallway.
- Carrying wash basin.
- Pushing oxygen concentrator.
- Carpal tunnel syndrome?
- Rheumatoid arthritis.
- Nothing in particular.
- I hurt my back last week. I don't remember.
- Bent down to open a drawer.
- When standing up from smoking a cigarette outside.
- Slipped and fell in parking lot (No ice, water or oil)

Case Management

- Prepare list of light duty jobs.
  Determine physical requirements.
  Make it available to treating physicians.
  Keep the worker on the job.
- Know the workers' compensation laws
  Select designated providers
- Follow the treatment, progress and cost.
  We care and we want you back.
- IMEs

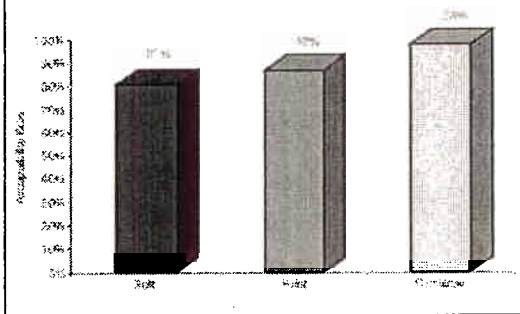
Results From Zero-Lift Patient Transfer Programs

Nursing Home

Garg and Owen (1992)

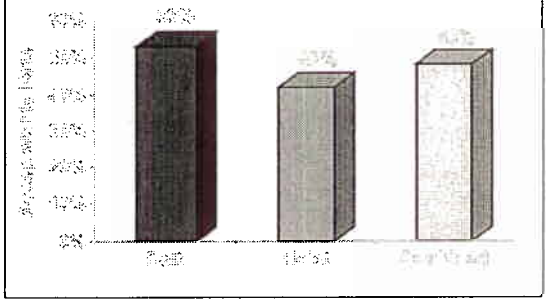
- 2 units, 140 beds
- Patients: BW = 132 lbs (81 – 264 lbs)
- Dependent, unpredictable, combative
- 57 nursing aides
- Post-intervention = 8 months
- Assistive devices = walking belt, mechanical hoist

ACCEPTABILITY RATE (%)



Belt Hoist Combined

ACCEPTABILITY RATE (NON-TRANSFERS)



Belt Hoist Combined

Borg RPE Scale

- 6
- 7 Very, very light
- 8
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- 10
- 11 Light
- 12
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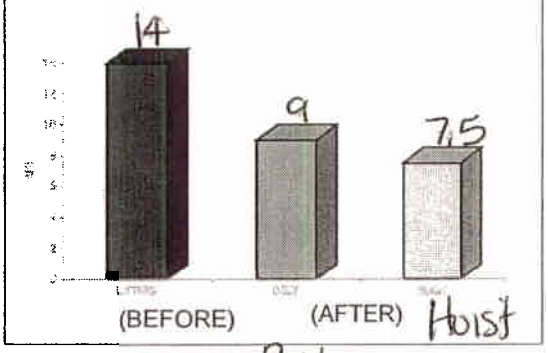
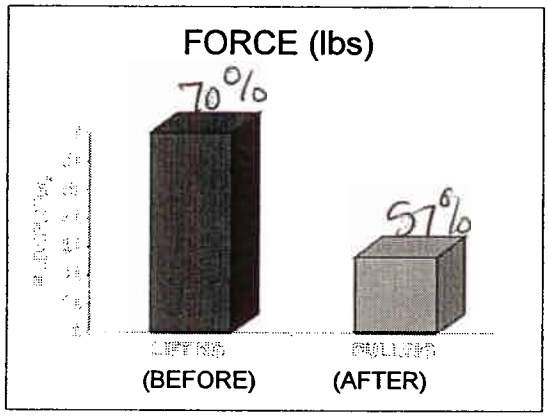
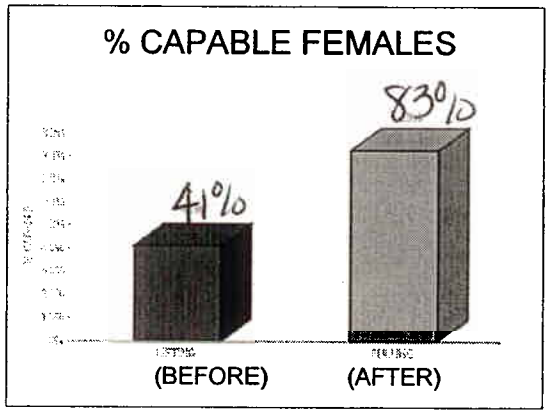
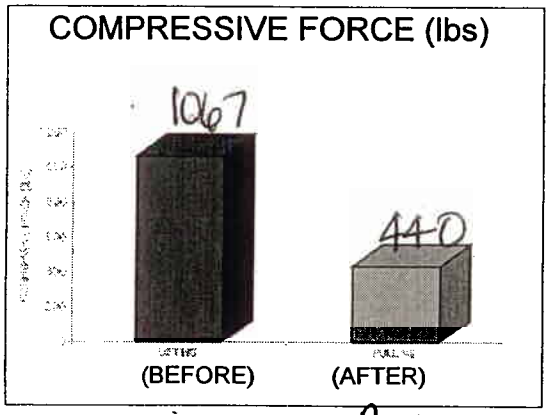
PERCEIVED EXERTION



Lifting Belt

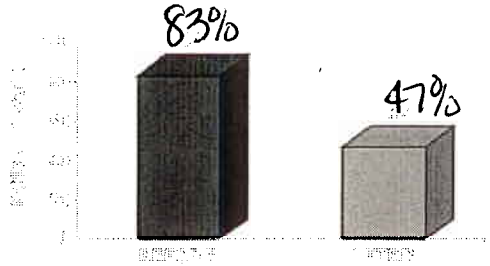




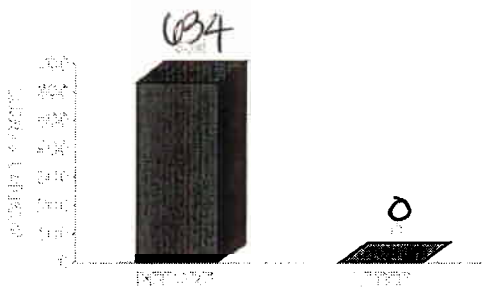


Lifting Pulling

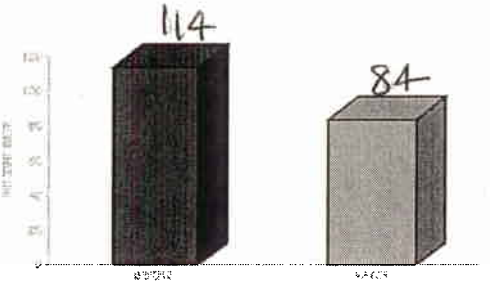
INCIDENT RATE – BACK INJURIES



SEVERITY RATE – BACK INJURIES



INCIDENT RATE – ALL INJURIES



Determination of Long-Term Effectiveness

Implementation of Zero-Lift Program in 8 Different Hospitals & Nursing Homes

General Observations About Eight Facilities

- Motivation for zero-lift program
  - Reduce injuries, lost workdays and workers' compensation costs
- Employee should buy into the program to be effective
- All had participatory task-force teams (ergonomic committees: 8-14 members)
- No structured training on basic ergonomics

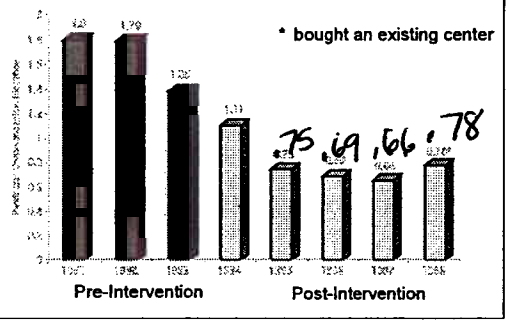
- Task targeting
  - Both management and employees believed manual lifting & transferring of patients were the most hazardous tasks
  - Also discussed tasks in housekeeping & dietary
- Assistive devices
  - All had battery operated total lifts and sit/stand lifts
  - 50% of facilities: walking belt, Slipp, shower chairs, weighing scales, shower gurneys, modern bath tubs
- Unadjustable beds (raise manually)
- Beds did not lock
- Most common methods: gait belts, under arm lift, bear hug

Key Message:
No Manual Lifting of Patients

Pre-intervention data = 3-4 years

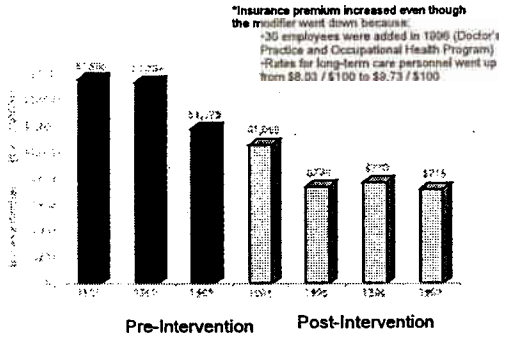
Post-intervention data = 3-5 years

Workers' Compensation Modifier - Corporation B

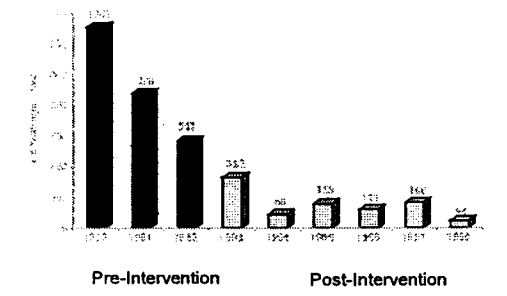


1991 92 93 1998

Insurance Premium - Corporation B



Lost Workdays - Corporation B



Summary of Percent Decrease in Number of Injuries

Nursing Home / Hospital	Patient Transfer	Entire Facility
A	56%	55%
B & C	39%	32%
D	55%	16%
E	79%	37%
F	63%	19%
G	78%	33%
H	64%	30%
Average	62%	32%

Summary of Percent Decrease in Lost Workdays

Nursing Home / Hospital	Patient Transfer	Entire Facility
A	99.6%	76%
B & C	86%	89%
D	95%	64%
E	50%	40%
F	94%	30%
G	99%	56%
H	80%	81%
Average	86%	62%

Summary of Percent Decrease in Restricted Workdays

Nursing Home / Hospital	Patient Transfer	Entire Facility
A	NA	NA
B & C	NA	10%
D	(17%)*	(220%)*
E	96%	81%
F	79%	48%
G	77%	39%
H	84%	75%
Average	64%	6%

* increase

Summary of Percent Decrease in Workers' Compensation Cost

Nursing Home / Hospital	Patient Transfer	Entire Facility
A	99.8%	NA
B & C	NA	50%
D	66%	40%
E	53%	32%
F	98%	62%
G	99%	79%
H	90%	66%
Average	84%	55%

Medical and Indemnity Costs (% of Total Cost) for Nursing Home E

Intervention	Year	Medical	Indemnity	Ratio
Pre-Intervention	1990	54%	41%	1.32
	1992	60%	30%	2.00
	1993	71%	15%	4.70
	1994	79%	21%	3.76
Average				2.91
Post-Intervention	1994	78%	22%	3.54%
	1995	47%	37%	1.27
	1996	76%	14%	5.43
	1997	88%	12%	7.30
	1998	100%	0%	Infinite
Average				4.38

Acuity Level of Residents
(Nursing Home D)

Year	Case Mix Index (CMI)*
1993	0.92
1994	0.88
1995	1.11
1996	1.11
1997	1.24

* 1.0 Average nursing home resident
< 1.0 Less medical care is required
> 1.0 Resident is more complex

Turnover Rate
(Nursing Home D)

Year	Turnover Rate
1987 - 1990	80% - 110%
1991	69%
1992	38%
1993	42%
1994	67%
1995	51%

Turnover Rate / Year

(Nursing Home B & C)

Year	Turnover Rate %	
	Nursing Home B	Nursing Home C
1991	123%	123%
1992	126%	124%
1993	126%	128%
1994	129%	135%
1995	127%	128%
1996	142%	124%

Skin Tears

(Treated Because of Dressing or Medication)
(Nursing Home D)

Year	Skin Tears
1991	16
1992	15
1993	17
1994	8
1995	5

Effects on Pregnant and Older Workers

(Nursing Home D)

- Pregnant Nursing Aides
  - 5 employees in the 3 years worked to the term
  - 1 employee did not because of medical reasons
- Older Workers
  - 3 NAs were over 60 years (7%)
  - 11 NAs were over 50 years (25%)

Some Comments

"I go home without my back being sore."

"We are a lot less tired at the end of the day."

"I am pregnant. Without this equipment there was no way I could continue to work."

"The resident was so large that we did not have muscle strength to move her. With the repositioning device, it was very easy."

Success Stories

- Nursing aide with herniated disc
  - Permanent restrictions
    - No lifting of more than 40 lbs
    - Repetitive bending and/or lifting should be avoided.
- With the "no-lift" program she had been working full duty (all patient transfers without any problems).

Nursing Personnel on Transitional Duty

- 12 nurses and nursing aides. 4 were on transitional duty (No lifting of more than 25 lbs, and no bending below the knees).
- Refused to demonstrate manual methods
- Made all patient transfers, including lifting the patients off the floor, with the patient transferring devices.

Improvement in Resident Mobility

- 1992, the resident was transferred using old lift.
- 1994, new lifts arrived.
  Transferred using a total-lift.
- One NA often questioned
  "Why doesn't this resident stand or walk?"
  "She seems to have strength in her legs, and there is no medical reason."

Improvement in Resident Mobility

- After many months and several requests, NA got approval from charge nurse.
  Found another willing NA to assist.
- Together they transferred resident using sit-stand lift.
- Now transfer requires only one NA and walking belt.

Conclusions

- Reduced injuries by 62%
- Reduced lost workdays by 86%
- Reduced modified duty by 64%
- Reduced workers' compensation cost by 84%
- No injuries to residents
- Reduced skin tears
- Pregnant women could continue regular assignments much longer.
- Older employees continued to work much longer.

Conclusions (cont.)

- Workers with LBP (bulging disc, herniated disc, surgery) could perform regular duties.
- Some employees on modified duty could perform their regular duties
- If an injured employee can lift 25lbs, he/she can perform his/her normal job.
- Workers were less tired at the end of the day
- Workers felt less back pain at the end of the day
- Improved employee moral

Conclusions (cont.)

- Improved patient comfort and safety
- Reduced call off rate
- Nursing sides don't have to wait for other aides to assist
- Improved resident care
- No increase in staffing or nursing aides

Implementing the Zero-Lift Patient Transfer Program

A Step by Step Approach

Arun Garg

Ergonomics Solution

⇩

Provide a nearly lift-free environment

1. Form an ergonomics committee

- Equal representation from management and workers.
- 12-15 members.
- Administrator, DON, ADON or staff development coordinator.
  Nurses.
  CNAs (leaders)
  Maintenance person, Housekeeping, Dietary
- All units or wings
- All three shifts
- Some permanent members, other rotating members
- Select ergonomics coordinator (10 hours/week)
- Meet at least once a month

2. Establish disciplinary procedure for not following established procedures and patient transferring equipment.
   - Verbal warning with documentation
   - Written warning
   - Final Warning*
   - Suspension
   - Discharge**

   * non serious resident injury or light duty
   ** Serious resident injury or lost workdays

3. Familiarize with patient transferring equipment
   - Contact vendors.
   - Try it out yourself.
   - Visit other nursing homes/hospitals.

   Criteria:
   - Patient safety.
   - Patient comfort.
   - Patient posture when lowering on toilet or WC.
   - Ease of applying and removing slings.
   - Ease of maneuvering. (Pushing/pulling, opening/closing base, etc.)
   - Cost.

Equipment

- Walking belts
- Sit / stand hoists
- Total hoists with / without scales
- Shower chairs
- Repositioning devices
- Ramp type weighing scales
- Shower gurneys

Walking Belt

- Do not lift, ***pull*** patient toward you
- Must be able to bear weight for 5 seconds
- Can pivot with assistance
- Weigh less than 170 lbs
- Reposition in wheel chair

Sit/Stand Hoist

- Can bear some weight (15%-20%)
- At least one foot can be placed flat on the floor
- Non-spastic (non-contracted lower extremity)
- May use with one side paralysis
- Cooperative and non-combative

Total Hoist

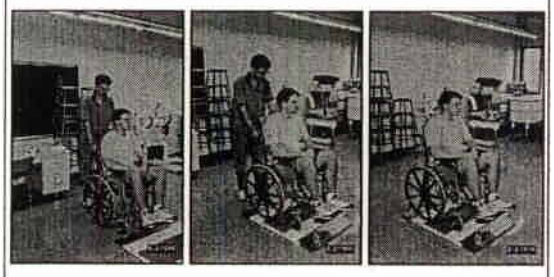
- Non-ambulatory
- Contracted lower extremity
- Cannot bear any weight (totally dependent)
- Uncooperative, combative ro resistive
- Lifting patients from floor

Shower Chair

- Showering patients
- Toileting patients (especially in confined workspaces)

Slipp, Airpal

- Reposition in bed
  - Up-down
  - Sideways
- Horizontal transfer
  - Bed to stretcher, shower gurney
- Moving patient fallen on floor (Example: from toilet room floor to patient room)



Ramp Type Weighing Scale

Transfer Board + Slipp + Walking Belt

- Transferring patients from automobile to wheelchair

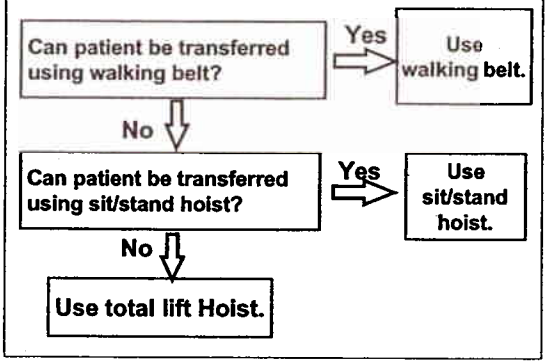
Select Mechanical Devices Carefully

- Reluctance to change and use
- Easily accessible ⇨ Number and placement
- Time ⇨ Selection and practice
- Ease of use ⇨ Selection and practice
- Education, training, feedback & reinforcement

4. Prepare patient transfer card for each resident.
   - Periodically update patient transfer card.

Transfer	Total Hoist	Sit/Stand Hoist	Walking Belt	Repos. Device	Shower Chair	Ramp Scale
Bed-WC		X				
WC-Toilet		X				
Off floor	X					
Repos. In Bed				X		
Weighing						X
etc...						

Decision Tree



How Many Devices

- Not all patients, based only on those who need
- Make each unit sufficient

- Walking belt: one for each patient
- Total lift hoist: One hoist for 8 – 12 patients
- Sit/Stand lift hoist: One hoist for 8 – 12 patients
- Shower chairs: 1 per 2 NAs
- Shower gurney: 1 per unit
- Weighing scale: 1 per unit

5. Select and Order Equipment

Equipment	Unit 1	Unit 2	Unit 3	Unit 4
Total Hoists With Scale	2	1	1	0
Total Hoists without sc.	1	1	0	0
Sit/Stand Hoists	1	2	1	1
Walking Belts (S,M,L)	5	7	9	12
Shower Chairs	1	1	1	0
Shower Gurney	1	0	0	0
Ramp-type Scales	1	1	0	0
Repositioning Devices	2	1	1	1

6. Train entire nursing staff.

- All CNAs.
- All nurses.
- DON, ADON, Staff development coordinator, etc.

- Hands on practice.
- Use CNAs to train new CNAs and nurses.

- Prepare videotapes and pictures.
- Prepare posters.
- Allocate space for storing equipment.
- Assign responsibility for charging equipment.

7. Assign Responsibility

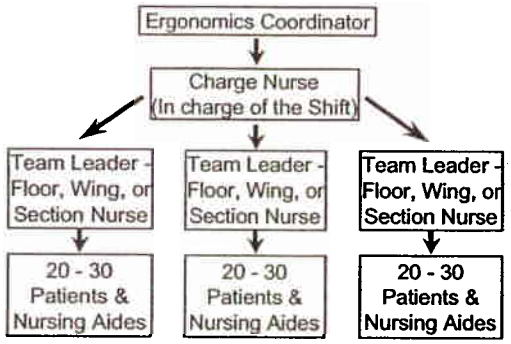
Ergonomics Coordinator

- Training
- Monitoring
- Feedback
- Enforcement
- Problem solving (Ergonomics committee)
- Periodic equipment check-up
- Injury investigation
- Case management

Responsibility for Training & Monitoring

- Designate certain CNAs and nurses as preceptors.
- Charge nurses: Each is responsible for about 20 residents and associate employees.
- Equipment inspection
- Sling inspection
- Equipment charging
- Ordering replacement parts

Assign Responsibility for training and follow-up



8. Provide a mechanism for reporting problems.
   - Change in resident condition. (Update resident transfer form)
   - Patient refuses use of equipment.
   - Problem transferring a specific patient.
   - Equipment breakdown.
   - Unforeseeable problems.
   - Provide an easily accessible mailbox.

9. Obtaining Feedback from Employees and residents.
   - Are they following the procedures.
   - Are they properly trained.
   - Are they having problems with resident transfers
   - Ratings of Perceived Exertion. High Rating?
   - Resident feedback
     - Comfort rating
     - Safety rating

10. Measure success.

- Number of injuries
- Number of back injuries
- Lost workdays
- Restricted workdays
- Medical payments
- Indemnity payments
- Group incentives?

Thank you.